

3. An ultrasonic motor having a piezoelectric vibrating member having a first driving polarized portion to cause a first flexion vibration wave and a second driving polarized portion to cause a second flexion vibration wave

deviated in phase with respect to the first flexion vibration wave, said ultrasonic motor characterized in that:

a detecting polarized portion is provided symmetrical about a loop of one of the first flexion vibration wave and the second flexion vibration wave to detect a drive signal based on oscillation in said driving polarized portion causing the one flexion vibration wave.

4. An ultrasonic motor according to claim 3, further including an amplifying circuit for amplifying the drive signal detected by said detecting polarized portion and a phase shift circuit for shifting a phase of the drive signal amplified by said amplifying circuit, wherein

the drive signal amplified by said amplifying circuit is fed back to said driving polarized portion that the drive signal has been detected by said driving polarized portion while the drive signal shifted in phase by said phase shift circuit is inputted to the other driving polarized portion.

5. An ultrasonic motor having a piezoelectric vibrating member a first driving polarized portion for causing a first flexion vibrating wave and a second driving polarized portion for causing a second flexion vibration wave deviated in phase with respect to the first flexion vibration wave, to self-oscillate said piezoelectric

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vibrating member thereby obtaining drive force, said ultrasonic motor comprising:

a first detecting polarized portion provided symmetrical about a loop of the first flexion vibrating wave to detect a drive signal based on oscillation on said first driving polarized portion;

a second detecting polarized portion provided symmetrical about a loop of the second flexion vibrating wave to detect a drive signal based on oscillation on said second driving polarized portion;

a first switching circuit for switching to one of said first detecting polarized portion and said second polarized portion;

an amplifying circuit for amplifying the drive signal detected by one of said detecting polarized portions to which said first switching circuit switches;

a phase shift circuit for shifting a phase of the drive signal amplified by said amplifying circuit;

a second switching circuit for feeding the drive signal amplified by said amplifying circuit back to said driving polarized portion that the drive signal has been detected by said one detecting polarized portion;

a third switching circuit for inputting the drive signal sifted in phase by said phase shift circuit to the other driving polarized portion; whereby

elliptic vibration is caused on said piezoelectric vibrating member due to the first flexion vibration wave and the second flexion vibration wave, and the elliptic oscillation is reversed in rotational direction by switching said first switching circuit, said second switching circuit and said third switching circuit.

6. An ultrasonic motor having a piezoelectric vibrating member a first driving polarized portion for causing a stretching vibration wave and a second driving polarized portion for causing a flexion vibrating wave, to self-oscillate said piezoelectric vibrating member thereby obtaining drive force, said ultrasonic motor characterized in that:

a detecting polarized portion is provided symmetrical about a loop of the flexion vibration wave on said piezoelectric vibrating member to detect a drive signal based on oscillation in said second driving polarized portion.

7. An ultrasonic motor according to claim 6, wherein said detecting polarized portion is provided symmetrical about a node of the stretching vibrating wave in place of the loop of the flexion vibration wave, to detect the drive signal based on oscillation in said first driving polarized portion.

8. An ultrasonic motor according to claim 6 or claim 7,

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wherein further including an amplifying circuit to amplify the drive signal detected by the detecting polarized portion, so that the drive signal amplified by the amplifying circuit is fed back to one driving polarized portion that the drive signal is detected by the detecting polarized portion while the amplified drive signal is inputted to the other driving polarized portion.

(6) 9. An ultrasonic motor according to claim 8, wherein a phase shift circuit for shifting a phase of the drive signal amplified by said amplifying circuit is provided between said amplifying circuit and the other driving polarized portion.

(3) 10. An ultrasonic motor according to claim 3, wherein said piezoelectric vibrating member is in a form of a cylinder and end face of said cylinder at an maximum displacement point is moved by the first flexion vibrating wave and the second flexion vibrating wave.

(6) 11. An ultrasonic motor provided with a piezoelectric vibrating member having a driving polarized portion to be oscillated in vertical vibration to cause said piezoelectric vibrating member to self-vibrate thereby obtaining drive force, said ultrasonic motor characterized in that a detecting polarized portion is provided in one part of said driving polarized portion to detect a drive signal based on oscillation in said driving polarized

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portion.

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12. An ultrasonic motor provided with a piezoelectric vibrating member having a driving polarized portion to be oscillated in torsional vibration to cause said piezoelectric vibrating member to self-vibrate thereby obtaining drive force, said ultrasonic motor characterized in that a detecting polarized portion is provided in a part of said driving polarized portion to detect a drive signal based on oscillation in said driving polarized portion.

(6)

13. An ultrasonic motor according to claim 11, wherein said detecting polarized portion is separately provided in a vertical vibrating direction of said driving polarized portion in place of the one part of said driving polarized portion.

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14. An ultrasonic motor according to claim 12, wherein said detecting polarized portion is separately provided in a thickness direction of said driving polarized portion in place of the one part of said driving polarized portion.

15. An ultrasonic motor according to any of claim 1 to claim 9, wherein said detecting polarized portion is provided in one part of said driving polarized portion that have detected the drive signal.

16. An ultrasonic motor according to any of claim 1 to claim 9, wherein said detecting polarized portion is

111 } separately provided from said driving polarized portion that have detected the drive signal.

17. An ultrasonic motor according to claim 16, wherein said detecting polarized portion and said driving polarized portion are formed integral in an overlying form.

112 } 2? → 18. An ultrasonic motor according to any of claim 1 to claim 9, wherein said detecting polarized portion uses a driving polarized portion that is not used for driving.

112 } 19. An ultrasonic motor according to any ^{one} of claim 3, claim 4 or claim 9, wherein a buffer circuit is provided between said amplifying circuit and said phase shift circuit which is high in input impedance but low in output impedance.

20. An ultrasonic motor according to claim 19, wherein a second amplifying circuit is provided between said phase shift circuit and the other driving polarized portion to amplify the drive signal shifted in phase by said phase shift circuit.

21. An electronic appliance characterized by being provided with said ultrasonic motor of any of claim 1 to claim 20.